For US WOCE Activities: 1998-2002

Analysis, Interpretation, Modeling and Synthesis (AIMS)

Program Announcement

DIRECTORATE FOR GEOSCIENCES

TARGET DATES: ***August 15 and February 15, 1997 - 2000***

World Ocean Circulation Experiment

National Science Foundation

National Aeronautics and Space Administration

Background

The goals of the World Ocean Circulation Experiment (WOCE) are to understand the general circulation of the ocean well enough to be able to model its present state and to predict its evolution in relation to long-term climate changes. To be effective, global climate models require such an oceanographic component. WOCE is a key element of the U.S. Global Change Research Program and the World Climate Research Programme. Planning for WOCE began in the early 1980s, and preliminary funding began, in the U.S., in 1986. The global field program began in 1990, and concludes in 1998. The international activities are documented in the WOCE Implementation Plan: Volumes I: (Detailed Requirements) and II: (Scientific Background). These can be identified as documents WCRP-11, WMO/TD 242, and WCRP-12, WMO/TD 243, respectively.

Since 1987, the National Science Foundation (NSF), National Aeronautics and Space Administration (NASA), National Oceanic and Atmospheric Administration (NOAA), Office of Naval Research (ONR), and the Department of Energy (DOE) have supported U.S. participation in WOCE. The agencies wish to encourage a wide variety of modeling and analysis projects in order to realize the maximum return on their investment in WOCE. The NSF Division of Ocean Sciences and the NASA Office of Mission to Planet Earth will collaborate with other government agencies, as appropriate, to consider proposals from U.S. scientists under this announcement.

Projects supported since the inception of the program include: the collection of global oceanic observations; global applications of existing models; theoretical studies relating to large-scale ocean circulation and the role of the ocean in climate; process and sensitivity studies that address basic scientific questions; and studies that address particular aspects of the WOCE observational data base. The term, "WOCE observational data" may be interpreted to include NASA satellite data from TOPEX/POSEIDON, and NSCAT, as well as sea surface temperature from the NASA/NOAA Pathfinder Project. Projects involving the assimilation of WOCE data into appropriate ocean or coupled ocean-atmosphere models are also encouraged.

Many elements of the internationally coordinated Implementation Plan have been identified as U.S. contri-butions. U.S. WOCE activities are coordinated by a Science Steering Committee (SSC) and by several implementation panels. Potential research areas and field programs in WOCE are prioritized by the SSC in a manner consistent with the scientific objectives, implementation plans, and current budget levels. This announcement addresses U.S. participation in the final phase of the international effort, specifically to: A. Assemble, quality-control, and integrate all data sets collected during WOCE with each other and with other data sets relevant to understanding the ocean circulation and its relation to climate, and, B. Assemble an archive of the overall results of WOCE - a description of the global ocean during the WOCE time frame - while ensuring easy access for researchers to the data contained therein. It is intended that this announcement shall stand throughout the Synthesis Phase of WOCE, (1998 to at least 2002), and it provides the necessary update to the Program Announcement for WOCE Modeling and 1994 Field Activities (released 1 July 1992), and supersedes Part II of NSF 95-85 (released 5 May 1995).

Further background and guidance for U.S. scientists interested in participating in the WOCE synthesis effort can be found in U.S. Planning Report Number 16, "U.S. WOCE Synthesis Plan", as well as the U.S. SSC position paper on modeling proposals (issued in March, 1993). Both are available from the U.S. WOCE Office. Further information is available on the World Wide Web:

http://www-ocean.tamu.edu/WOCE/uswoce.html.

Analysis, Interpretation, Modeling, and Synthesis (AIMS)

The WOCE data set provides the most comprehensive series of measurements of the global ocean yet made. Details on the data sets, their location and availability are provided through the WOCE Data Information Unit (DIU) at the University of Delaware,

Web site: http://www.cms.udel.edu, or e-mail: woce.diu@diu.cms.udel.edu. Access to satellite data is through the JPL Physical Oceanography Data Active Archive Center (JPL PODAAC), Web site: http://podaac.jpl.nasa.gov; email: podaac@podaac.jpl.nasa.gov. Most, if not all, of the other data sets may also be accessed through the internet. Their use is encouraged by WOCE.

As indicated above, the principal goal of WOCE is to understand the ocean circulation and its relation to climate. Part of this goal includes the interpretation and synthesis of WOCE results. It is also expected that the understanding obtained from the WOCE field program will be used to identify key ocean measurements that will be needed as indices of global change, and to design long-term observing systems to monitor, understand, and predict those changes.

Studies to be supported under this announcement may include the analysis and interpretation of WOCE data (with or without other contemporary data sets), the assimilation of WOCE data into ocean or coupled ocean/atmosphere models, comparison of the data with model products, continuation of WOCE modeling and data assimilation activities, and production of data compilations, climatologies and atlases. It is understood that the basic analysis and interpretation of individual data sets and model results will continue, and it is also expected that these will be completed, and the data made public and generally available to the community within two years of the measurements. Beyond that, it is important to continue the task of combining results on a basin- (e.g., North Pacific, Indian Ocean, South Atlantic, etc.) or global-scale, with the latter in particular to be encouraged. These activities may be enhanced by the wider availability of data products derived from WOCE and WOCE-related programs. Projects involving the production and distribution of these data products (as envisioned in the concept of WOCE special analysis centers) are needed to support a wider range of modeling and analysis efforts. Comparison of these results with those of other large programs carried out contemporaneously or in previous years may also be considered.

Proposals will be considered that are directed to the synthetical activities covered in Streams I and II, as documented below. Proposals should directly address WOCE goals. To be most responsive to this announcement, proposals should:

1. Complete the basic analyses and interpretation of individual WOCE data sets on regional to basin scales,

OR

2. Use WOCE data and/or ocean circulation models in analysis, interpretation and model improvement on basin to global scales.

Stream I - Synthetical activities

a. Core activities

The aim of this stream is to ensure integration of the individual efforts taken throughout the different basins to produce a global result. Topics covered under this heading might include, AMONG OTHERS, the interpretation of tracer distributions within an ocean basin, the assembly of current meter records and hydrographic data to provide estimates of intermediate or abyssal flow fields, establishing the mean surface or intermediate depth flow fields and their variances from drifter or float data, estimating diapycnal mixing from a combination of hydrographic data, current meter arrays and tracer fields, establishing the variability of upper ocean heat content from VOS data, and the like. Further, no matter how the data are “mapped” or “analyzed”, efforts to estimate the errors present in WOCE data are sought. Although there are many different types of error, an important approach might be studies of the statistical variability of the data themselves, as well as analyses of specific errors and uncertainties inherent in the data sets. Also, it is especially important to estimate the spatial and temporal coherence of errors. The use of contemporaneous and historical data, where appropriate to provide greater data density and comparisons, is also encouraged.

b. Special activities

It is recognized that certain activities, such as the compilation of atlases and gridded climatologies relating to the WOCE data set, are likely to be of great use to the whole oceanographic community. Although their preparation is not normally considered research, because the WOCE data set will be of most use in its entirety, it is considered

important to provide funding for these activities. Additionally, to put the WOCE data set in context, historical data bases for each type of data could be assembled in a common format and subjected to the same quality control standards as the WOCE data set. A further activity might be the development of tools that would allow investigators to create climatologies of various parameters on different grids for use in models.

c. Model-data combinations

One of the main aims of WOCE is to provide a data set that may be used to validate and improve models by comparing model and data products. Conversely, such a comparison can assist with extending the descriptions and understanding of processes occurring in the ocean. Proposals will be accepted that intend using WOCE, NASA satellite (e.g., TOPEX/POSEIDON, NSCAT), and other data sets for these purposes.

It is recognized that model results may be improved in many cases by incorporating data into the analysis. This is often not an easy task, and further development of the ability to assimilate different data types into models is required. Proposals will be accepted that concentrate on this aspect of model development. Anticipated products of Stream I work include: published papers, data reports, atlases, climatologies, and CD-ROMs of individual and combined data sets on basin and/or global scales. It is anticipated that such analyses could be conducted by individual PIs, by groups of PIs, or through workshops. Proposals for all these possibilities will be considered.

Stream II - Model development and testing

Many of the individual and group efforts covered under Stream I will employ models. Model development has been considered an important part of WOCE for many years (see e.g., the U.S. SSC position paper on modeling originally issued in March 1993 and available from the U.S. WOCE Office). Stream II addresses the continued need for model development during the Synthesis Phase, particularly on global scales. Previous efforts have included global applications of existing models, theoretical studies relating to large-scale ocean circulation and the role of the ocean in climate, process and sensitivity studies that address basic scientific questions, and studies of particular aspects of the WOCE observational data base. These studies will be continued.

The WOCE community also wishes to encourage continued efforts to improve models by, for instance, adopting alternative dynamical equations, improving the parameterization of sub-grid-scale effects, investigating novel vertical and horizontal gridding schemes, and the use of more efficient computational algorithms. Proposals on all these topics will be considered.

To date, much of the modeling development has taken place through individual PI efforts. NSF encourages the continuation of these efforts, but mindful of the complex nature of ocean general circulation models (OGCMs) and coupled models, also wishes to encourage groups of PIs to combine their energies and cooperate on model developments as described above.

GENERAL INFORMATION

The first target date for submissions in response to this announcement is 15 August 1997. Future target dates will be 15 February and 15 August, in coordination with the target dates for submission to the Ocean Sciences Research Programs. It is expected that proposals will be accepted every six months through at least the year 2000, as the analysis unfolds, and as results prompt new and different approaches. Most awards resulting from this announcement are expected to range from approximately $50,000 up to $200,000 annually, and be of 2 - 5 years duration. The annual amount available from all sources for this competition is expected to be approximately $2-12 million, pending the availability of funds.

PROPOSAL PREPARATION

Proposals submitted in response to this Program Announcement will be accepted from colleges, universities, other not-for-profit institutions in the United States, as well as U.S. Federal labs. Awards to Federal labs will be made by NASA and some additional information may be required before such awards can be made. Proposals should be prepared

and submitted in accordance with the guidelines provided in the NSF publication, *Grant Proposal Guide* (GPG) NSF 95-27 or subsequent versions. Single copies of this publication are available at no cost from:

Forms and Publications Unit
National Science Foundation
4201 Wilson Blvd. -- ROOM P-15
Arlington, VA 22230
TEL: (703) 306-1130
e-mail: pubs@nsf.gov

Proposals will be subjected to initial screening for conformance with GPG requirements, including adherence to the 15 page limit for project descriptions, and will be returned without review or advance notification if deficiencies are found. Proposals will NOT be forwarded to other Programs if found to be inappropriate for this competition. The original and twenty copies of each Proposal submitted in response to this program announcement should be sent to:

NSF Proposal Processing Unit
4201 Wilson Blvd., Room P-60
Arlington VA, 22230

and be identified by entering "WOCE - AIMS" in the Program announcement block on the cover page.

Proposers are required to provide the U.S. WOCE Office with an informational copy of the proposal which the SSC will review for relevance and priority with respect to U.S. WOCE goals. Each proposal must include a plan for documentation, archiving, and dissemination of data and project results. All funded participants must adhere to data management policies applying to recipients of federal funding in the geosciences. Additionally, participants must adhere to data submission schedules and data management requirements established by WOCE. For details on the latter, please consult the U.S. WOCE homepage on the World-Wide Web.

Questions regarding the U.S. WOCE program should be addressed to:

Dr. Piers Chapman, Director
U.S. WOCE Office
Department of Oceanography
Texas A&M University
College Station, TX, 77843-3146
TEL: (409) 845-1443
e-mail: uswoce@ocean.tamu.edu

Questions regarding proposal preparation or submission may be directed to

Dr. Richard Lambert
Physical Oceanography Program, Room 725
National Science Foundation
4201 Wilson Blvd., Arlington, VA 22230
TEL: (703) 306-1583
e-mail: rlambert@nsf.gov

or to

Dr. Eric Lindstrom
Physical Oceanography Program
NASA Headquarters, Code YS
300 E Street SW, Washington, DC 20546
TEL: (202) 358-4540
e-mail: elindstrom@hq.nasa.gov

PROPOSAL REVIEW AND GRANTS ADMINISTRATION

Proposals will be evaluated on the basis of the general criteria outlined in the NSF Grant Proposal Guide and in accordance with procedures for external merit review established by NSF and NASA. The National Science Foundation is in the process of revising the merit review criteria. For the August 1997 competition, the four criteria found on page 13 of the current GPG (NSF 97-27) will be used in evaluating the proposals. The revised criteria will be used in future competitions and will be included in the next version of the *Grant Proposal Guide*. Please make sure that you have the most recent version of the *Grant Proposal Guide* when submitting proposals for 1998 and beyond.
Proposal responsiveness to the goals of WOCE AIMS and the degree of complementarity with other projects will also be considered.

NASA will directly award grants as a result of the proposal review and selection process outlined in this announcement. NASA grant or cooperative agreement awards made as a result of this notice will

be administered in accordance with the NASA Grant and Cooperative Agreement Handbook (NHB 5800.1).

NSF grants awarded as a result of this announcement are administered in accordance with the terms and conditions of NSF GC-1, "Grant General Conditions,: or FDP-III, "Federal Demonstration Partnership General Terms and Conditions," depending on the grantee organization. Copies of these NSF publications are available at no cost from the NSF Forms and Publications Unit. More comprehensive information is contained in the NSF Grant Policy Manual (NSF 95-26, October 1995), for sale through the Superintendent of Documents, Government Printing Office, Washington, DC 20402. The telephone number at GPO is (202) 783-3238 for subscription information.

NSF and NASA provide awards for research in the sciences and engineering. The awardee is wholly responsible for the conduct of such research and preparation of the results for publication. The NSF and NASA do not assume responsibility for such findings or their interpretation. In accordance with Federal statutes and regulations and NSF and NASA policies, no person on grounds of race, color, age, sex, national origin, or disability shall be excluded from participation in, denied the benefits of, or be subject to discrimination under any program activity receiving financial assistance from NSF or NASA.

The NSF and NASA welcome proposals on behalf of all qualified scientists and engineers, and strongly encourages women, minorities and persons with disabilities to compete fully in any of the research and research-related Programs described in this document.

NSF is equipped with TDD (Telephonic Device for the Deaf) which enables the hearing impaired to request information on NSF programs, employment, or other matters. The number is (703) 306-0090; for FIRS, 1-800-877-8339. Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provides funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on an NSF project. See Program Announcement NSF 91-54 or contact the program coordinator (703)306-1636.

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on the proposal forms is solicited under the authority of the National Science Foundation Act of 1950, as amended. It will be used in connection with the selection of qualified proposals and may be disclosed to qualified reviewers and staff assistants as part of the review process; to applicant institutions/grantees to provide or obtain data regarding the application review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers as necessary to complete assigned work; and to other government agencies in order to coordinate programs. See systems of Records, NSF-50, "Principal Investigator/Proposal file and Associate Records," 60 Federal Register 4449 (January 23, 1995), and NSF-51, "Reviewer/Proposal File and Associated Records," 59 Federal Register 8031 (February 17, 1994). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of your receiving an award.

The public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate or any other aspect of this collection of information including suggestions for reducing this burden, to:

Herman G. Fleming
Reports Clearance Officer
Contracts, Policy and Oversight
National Science Foundation
Arlington, VA 22230

This program is described in the Catalog of Federal Domestic Assistance category 47.050

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ARLINGTON, VA 22230

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